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A National Environmental/Energy Workforce Assessment. Nevada

National Field Research Center, Inc, Iowa City, Iowa

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A National Environmental/Energy Workforce Assessment

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This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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WORKFORCE ASSESSMENT

for

NEVADA

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

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Mr. Lou Dodgion
Water Supply

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PREFACE

This report identifies existing workforce levels, training programs, career opportunities, and future staffing level projections (1976-1982), based on the information available for the State of Nevada in the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, waste water, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center, Inc., of Iowa City, Iowa.

The information contained in this report was compiled through extensive on-site interviews with professionals working in the respective areas noted above and with telephone interviews and literature research in all areas.

FOREWORD

Information for this report was largely compiled from on-site interviews with professionals working in the various pollution control areas of air, noise, pesticides, potable water, radiation, solid waste, waste water, and energy. To strive for a higher degree of reliability, interviews were frequently followed-up by telephone contact to facilitate clarification and revalidation of information when necessary.

It should be noted that all workforce projections are based on the professional judgement of those persons interviewed.

A review of existing legislation and pertinent program literature provided information concerning program priorities, goals, and objectives. This information was also helpful in identifying future career opportunities.

National Environmental Energy Workforce Assessment

Phase I

NEVADA

State Summary

I. AIR

The Air Quality Section of the Environmental Protection Services (EPS) within the Department of Human Resources has primary responsibility for the state air pollution control and abatement program. Local air pollution authorities in Clark and Washoe Counties are handled through the District Health Department.

Public air pollution control workforce activity involves 22 professional staff. They consist mainly of engineers, scientists, and technicians. Industry employs another estimated 15 people.

The EPS Air Section expects to employ an additional eight persons over the next five years. Specific workforce projections for industrial and municipal air pollution control authorities were not available, although more stringent enforcement of existing regulations and the possible development of additional air quality standards is expected to necessitate workforce increases in both municipal and industrial air pollution abatement areas. Personnel required would include technicians, scientists, engineers, and meteorologists.

While there are no formal training programs, EPS staff have received supervisory training, first-aid training, quality assurance training, and fire fighting training. Occasional seminars, such as stack sampling, are also held for staff enrichment.

There is also a proposed auto inspection program which, if funded, could create the need for 12 additional staff over the next five years.

II. NOISE

The noise abatement activities are considered a low priority program at the present time. OSHA noise regulations are enforced by the Industrial Commission Occupational Safety and Health Board (ICOSHB). On the municipal level, enforcement is the responsibility of local law personnel, and enforcement occurs on a nuisance complaint basis for the most part.

Currently Las Vegas is the only city in Nevada which has municipal noise ordinances. They include areas of nuisance, vehicles, and zoning. There are also various statewide restrictions pertaining to motor vehicle, motorcycle, and off-road recreational vehicle sound level limits.

A part-time noise control workforce of thirteen professionals is estimated by ICOSHB sources for maintaining statewide noise abatement activities. They include two administrators, two industrial hygienists, and nine safety and health specialists who regularly do health compliance monitoring in several areas in addition to noise.

No increase is expected in the workforce in the compliance monitoring of OSHA regulations. However, the implementation of EPA's national program strategy to abate noise may create an abundance of activity at the state and local levels. Their approach to state and local communities will be implemented when additional personnel resources become available to the noise program, hopefully, in October, 1977.

III. PESTICIDES

The Nevada Department of Agriculture, Division of Plant Industry, is the prime authority for the control and abatement of pesticide misuse and pollution. Departmental program efforts are supported through cooperative agreements with the University of Nevada and a cooperative enforcement agreement with the EPA.

There are seventeen professional administrative and field positions within the Division dealing with pesticides. In the private sector there are an estimated 963 certified commercial and private pesticide applicators.

No increases in Departmental staff are expected over the next five years. However, within that time, commercial and private pesticide applicator personnel are estimated to increase by 500, providing a workforce of close to 1,400 applicators certified to handle restricted-use pesticides.

The Department, in cooperation with the University of Nevada Extension Service, provides a pesticide applicator training program. It was attended by approximately 1,030 persons during the last two years and covered twenty topics dealing with pest control.

Future employment will be limited, but may increase with regulatory responsibilities mandated through federal programs involving the Toxic Substances Control Act. Future career opportunities will include areas of hazardous waste disposal, pesticide inspection, and research activities in integrated pest management.

IV. POTABLE WATER

Administration of Nevada's requirements pertaining to drinking water is vested in the State Department of Human Resources, Division of Health, with assistance by the Clark and Washoe County Health Districts. Currently there are five people allocated to the drinking water supervision program. These people are engineers and inspectors whose duties include site inspections, water system plans approval, water quality analysis, and regulation enforcement. An increase of eight persons is expected over the next five years which will reflect the increased workload developed through state primacy acceptance of the Safe Drinking Water Act.

The number of personnel involved in municipal water treatment is difficult to ascertain as a water treatment operator certification program is yet to be established. But, it is estimated to involve approximately 100 people. Little or no growth is projected for this workforce.

While there are no formal training programs presently operating, the Department does provide on-site training in conjunction with their site inspection activities on an irregular basis. If mandatory certification is realized, training will be formalized to be in compliance with state regulations.

Career opportunities are expected to be limited in this area although acceptance concerning primacy of the Safe Drinking Water Act may influence growth activity.

V. RADIATION

The Radiological Health Section of the Department of Health and Welfare has regulatory responsibility for statewide radiation control. They do, however, operate in an agreement state with the U.S. Nuclear Regulatory Commission.

The staff of the Health Section consists of two professionals who are radiological health physicists with extensive field experience. One additional person may be added within the next five years whose duties would support monitoring, registration, and licensing activity.

Private sector workforce activity is based on information contained in ERDA Publication #78 entitled An Analysis of Nuclear Related Technician Manpower in Western States due to unavailability of information from private sector sources. As of the first of January, 1975, there were 94 radiation control technicians in Nevada. This number is expected to increase by an additional 60 by 1977.

Some training is available through ERDA seminars and courses offered by the Nuclear Regulatory Commission.

As dependence on nuclear power production increases, and research and development activity expands, many good career opportunities will be developed. Sources in the field have indicated that jobs will become available for highly trained engineers and health physicists as well as for technicians, maintenance, and labor personnel. The majority of these positions are expected to develop at the private industry level as radiation becomes a more widely used technological tool.

VI. SOLID WASTE

The Department of Human Resources has been designated as the state agency responsible for the administration of all regulatory functions set forth in the Solid Waste Disposal Act.

In support of the Department's regulatory activities, the State Environmental Commission has been delegated authority to develop a statewide solid waste management system in cooperation with the governing bodies of existing municipalities.

At the present time, three sanitary engineers provide full-time solid waste management and enforcement capabilities for the Department.

Investigations and inspections of solid waste disposal systems are carried out by personnel under contract through the Bureau of Consumer Health Services. This workforce is used on a part-time basis and involves nine inspectors with degrees in the biological science field.

Private sector workforce activity is estimated to involve 56 persons in disposal and 250 persons in collection.

It has been suggested by professionals in the field, that as a result of more stringent regulation enforcement and possible increased responsibilities mandated by the Resource Conservation and Recovery Act, a probable increase of four staff members will occur over the next five years. Private sector projections indicate a 7 percent per annum growth in disposal personnel and a 10 percent per annum growth in collection.

VII. WASTE WATER

The Department of Human Resources has been designated as the state water pollution control agency for all purposes of federal water pollution control legislation. The State Environmental Commission provides the one exception to this in that the Commission has the exclusive power to promulgate rules and regulations concerning water pollution control.

Departmental waste water workforce staffing involves seven professional personnel. They include engineers, scientists, and planners.

At the present time, the private sector workforce involves 66 waste water treatment plant operators.

Workforce projections indicate a growth in public sector staffing by three positions over the next five years. Private sector workforce increases are anticipated to involve the addition of 59 certified waste water treatment plant operators. These additional operators are expected to be needed as new facility construction continues and upgrade of existing facilities becomes necessary. Although certification of waste water operator personnel is conducted on a voluntary basis, training in the future is anticipated to become an important component in the effort to eliminate waste water pollution in Nevada.

VIII. ENERGY

Through the Nevada state legislative process, two principal agencies have been assigned responsibilities concerning energy management. The Energy Management Division of the Public Service Commission and the Energy Resources Advisory Board jointly provide recommendations concerning energy resources, conservation and efficient utilization.

A specific full-time energy management workforce does not appear to exist as an entity of its own at this point in time. However, there have been approximately 20 appointed positions developed through legislation involving the Energy Management Division and the Energy Resources Advisory Board.

Due to the part-time nature of the existing positions, no workforce increases are expected to develop in the next five years. If full-time employment in this area does develop, it is expected to be extremely dependent on federal funding.

The Energy Resources Advisory Board is responsible for providing recommendations concerning appropriate legislation and regulations to promote the conservation and economical utilization of energy resources and supplies. At the present time no formalized training programs are operational; however, the development of a public oriented educational program to promote conservation and proper utilization of energy resources is expected to develop within the next five years.

STATE OF NEVADA - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR[1]	7	9	11	13	15	15	17%
NOISE[2]	0	0	0	0	0	0	n/a
PESTICIDES[3]	17	17	17	17	17	17	0%
POTABLE WATER[4]	105	106	108	111	112	113	1%
RADIATION[5]	2	2	3	3	3	3	10%
SOLID WASTE[6]	317	349	380	417	460	496	9%
WASTEWATER[7]	76	87	99	114	128	138	13%
ENERGY[8]	0	0	0	0	0	0	0%
TOTAL	524	570	618	675	735	782	8%

[1]The above does not include 15 municipal and 15 industrial personnel for which projections were not available.

[2]The above does not include part-time ICOSHB personnel for which projections were not available.

[3]The above does not include 963 pesticide applicator personnel for which projections were not available.

[4]The above includes 100 water supply treatment plant operators.

[5]The above does not include 123 radiation control technicians in the private sector for which projections were not available.

[6]The above includes regulatory, disposal, and collection personnel.

[7]The above includes both public and private sector personnel.

[8]The above does not include part-time appointed Advisory Board positions.

EDUCATION

The higher education system of Nevada has not developed a strong environmental program, per se, to date. Most of the offerings are environmentally related courses within individual disciplines. This is partially due to the absence of a strong demand for consolidation of courses under one department, in conjunction with limited financial resources for program development.

The majority of Nevada's higher institutions fall within the University of Nevada System. This consists of three community colleges and two universities, one at Reno and one at Las Vegas.

The three community colleges offer several environmentally related courses. The following is a partial list of courses that have been developed, although they are not necessarily taught every term nor are they all available at all campuses.

Man and Environment
Man and Climate
Wilderness Survival
Energy: Current Problems and Solutions
Introduction to Environmental Planning
Applied Climatology
Air Pollution Techniques and Problems
Ecological Principles for Economic Development

The University of Nevada, Reno, offers environmentally related courses through the interdisciplinary area. These include such courses as "Man and Environment," "Community Environmental Planning," "Lifestyles and the Environment," and "Seminar on Lifestyles and the Environment."

LEGISLATION

The environmental/energy legislation for Nevada was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Air Pollution Control Act

Custom Application of Pesticides Law

Solid Waste Disposal Law

Water Pollution Control Law

Energy Management Law

Energy Resources Advisory Board

National Environmental Energy Workforce Assessment

Phase I

NEVADA

State Report

STATE PROFILE

The State of Nevada covers a total land mass of 110,540 square miles, of which inland waters make up 651 square miles. It ranks seventh in size among the states. From north to south, at its maximum, the state measures 485 miles and from east to west, 315 miles.

Mining and ranching were formerly the main economic activities in Nevada. The state was world-famous for its rich gold and silver output. However, the present production of these metals is no longer sufficient to rank it with the major gold and silver states of the West. Nevertheless, mineral production ranks higher than manufacturing in importance to the economy.

At present, fewer than 5,000 people are employed in agriculture. Of the remaining workforce, about 40 percent are employed in the service industries. Wholesale and retail trade account for 19 percent, and government at federal, state, and local levels for about 18 percent. About 7 percent are employed in transportation and public utilities, 6 percent in contract construction, 4 percent in finance, insurance, and real estate, and 4 percent in manufacturing. The large number of people engaged in services reflects the heavy dependence on tourism. Income derived directly from tourism amounts to roughly 50 percent of total income in the state.

Nevada is one of the least populous states, and in density of population it ranks among the lowest in the United States. However, it is also one of the most fastest growing areas. The population rose from

488,738 in 1970,to 592,000 in 1976, an increase of 21 percent. The population distribution is uneven, however, with 90 percent of Nevadans classified as inhabitants of urban areas and 10 percent as rural.

Las Vegas and Reno are the two major urban population areas. Originally both were minor stops on the historic routes to California, but both have been growing rapidly. Gambling and resort activity stimulated by the growing population of southern California, by rapid transportation, and by the development of air conditioning, have given both places a cosmopolitan appearance.

NEVADA POLLUTION CONTROL AND ABATEMENT AGENCIES

The Department of Human Resources, Environmental Protection Services (EPS) has been assigned authority as the lead environmental agency in Nevada. As the principal regulatory agency, the Department works in cooperation with the State Environmental Commission. The Commission has been assigned powers and duties relevant to establishing rules and regulations in the pollution control areas of air, waste water, and solid waste. Water quality is handled through the State Health Department, Consumer Health Program.

The State Environmental Commission is a division of the State Department of Conservation and Natural Resources. The Commission consists of:

1) The Director of the Nevada Department of Fish and Game
2) The State Forester Fire Warden
3) The State Engineer
4) The Executive Director of the State Department of Agriculture;
5) A member of the State Board of Health to be designated by that board; and
6) Four members appointed by the governor who have demonstrated knowledge and expertise.

The Department of Human Resources provides technical advice, support and assistance to the commission. All state officers, departments, commissions and agencies, including but not limited to, the Department of Highways, the State Department of Conservation and Natural Resources, the Nevada Department of Fish and Game, the University of Nevada System, the State Public Works Board, the Department of Motor Vehicles, the Public

Service Commission of Nevada and the State Department of Agriculture may also provide technical advice, support and assistance to the commission.

The Department of Agriculture (DOA) is the state lead agency for the control of pesticide use. This is carried out through a program of monitoring, certification, and education, with the assistance of state extension services and regional agricultural offices. This agency is responsible for regulating the use of agricultural pesticides. licensing pesticide users, and providing a certification program for pesticide applicators. There are a total of 117 professional staff members who administrate, conduct inspections, and manage licensing and certification activity.

In addition, the Nevada State Board of Health maintains responsibilities for the development and administration of rules and regulations designed to protect the general public against unnecessary exposure to radiation hazards. The Board is also involved in the public health aspects of drinking water supply.

Pollution Control and Abatement Programs

I. AIR

A. Introduction

Primary responsibility for the state air pollution control and abatement program is vested within the Department of Human Resources, Environmental Protection Services (EPS). The state goal is to improve the quality of air within the state. To accomplish this, the EPS has established the following objectives:

1. Improve and maintain the air sampling network to determine the state's air quality. The accomplishment of this objective is many faceted. Activities involved are 1) analyzation, modification, and expansion of the state's air sampling network, 2) development and implementation of procedures for data gathering through private contract or staff assignment, and 3) verification of accuracy of data and collection system every six months.

2. Identify suspected controllable air pollution sources. Current activities involved in this objective are 1) establishment and maintenance of statewide continuous inspection schedule to locate controllable air pollution sources, and 2) continuous review of available publications, new media, environmental impact statements, and other programs for possible identification of controllable air pollution sources.

3. Register and issue operating permits to identified controllable air pollution sources. The activities here include 1) distribution in written form to controllable air pollution sources of information and procedures within five working days after identification, 2) making site inspections and calculating relationships between air emissions, geography, and surrounding air to determine appropriate regulation application, within fifteen working days after identification, 3) making final inspection within seven working days of sources upon receipt of notice of completion of construction and filing necessary report of denial or approval, and 4) publishing and updating annually the state's emission inventory.

4. Insurance of statewide compliance of controllable air pollution sources with published Air Quality Regulations. The activities involved here are 1) reviewing, updating, and publishing Air Quality Regulations in conformance with law, policy, and procedures annually, 2) reviewing, providing necessary information, updating, and publishing State Implementation Plan by July 1 yearly, and 3) reviewing source inventory, developing and modifying inspection schedules at least quarterly.

5. Insure and maintain the technical competency of those involved in air quality control through training, education, and information. This objective is to be accomplished by 1) conducting visible emission training programs semi-annually, and 2) providing needed training to enhance the quality of the staff through an assessment of individual needs and the development of a formal training plan.

6. Develop a proposed program to determine the needs within EPS for biological monitoring. The accomplishment of this objective will be met through 1) assessing the need to develop a biological and chemical monitoring assessment program and 2) developing a plan for possible implementation of a biological and chemical program.

7. Reviewing local programs. This objective is an ongoing program of evaluating local air pollution control regulations and local programs.

Local air pollution authorities in Clark and Washoe County are handled through the District Health Department. Total statewide public air pollution control workforce activity is estimated to involve 22 professional staff positions.

While Nevada has a population of 592,000 located in 110,540 square miles, over 80 percent of the people are centered in or near two relatively small urban areas of the Las Vegas Basin and the Truckee Meadows. The rest are widely scattered throughout the State in small towns and rural areas. The State is divided into three Air Quality Control Regions (AQCR), one of which is an interstate region also incorporating a part

of Arizona. These regions are as follows:

Clark-Mohave Interstate Air Quality Control Region (AQCR 013)

In the State of Arizona: Mohave County, Yuma County
In the State of Nevada: Clark County

Nevada Intrastate Air Quality Control Region (AQCR 147)

Churchill County	Lincoln County
Elko County	Mineral County
Esmeraldo County	Nye County
Humboldt County	Pershing County
Lander County	White Pine County

Northwest Nevada Intrastate Air Quality Control Region (AQCR 148)

Carson City	Storey County
Douglas County	Washoe County
Lyon County	

Over 1,000,000 tons of pollutants are emitted into the atmosphere each year in Nevada, according to a study conducted by the consulting firm of TRW (1970) in which over 40 percent of the pollutants are produced by motor vehicles (versus 50% on a national basis). This makes the automobile the single most important source of air pollution in Nevada (and in the country).

At the present time, the only area in Nevada that has a critical auto emission problem is the Las Vegas Basin. To ensure that the automobile on the road in the Las Vegas Basin are properly tuned and in good repair, which would minimize the amount of air pollutants emitted, the Nevada Environmental Commission has proposed an inspection program requiring, upon change of ownership, all light duty vehicles in Clark County meet specific inspection criteria.

The reasons the whole county was chosen, instead of just the Basin, are because the enforcement problems would be insurmountable in just the

Basin, and over 90 percent of the light duty vehicles registered in Clark County are located in the Basin.

The most significant urban problem in air pollution in Nevada today is due to smog, which is closely associated with automobile exhaust. The problem is most significant in the Las Vegas Basin and will also be a major problem in the Reno area within the next five years.

B. Workforce Profile

The Air Quality Control Section is actively involved in monitoring, enforcing, and administering air pollution control efforts in Nevada. The governing rules and regulations reveal that it is the public policy of the State to preserve the air resources of the State, to protect, maintain, and improve the quality thereof, and to cooperate with other agencies of the state, agencies of other states, and the federal government in carrying out these objectives.

The regulations cover such areas as registration certificates and operating permits, visible emissions from stationary sources, open burning, incinerator burning, particulate matter, sulfur emissions, organic solvent and other volatile components, and ambient air quality standards.

The staff of seven currently consists of engineers, technicians, and a scientist. Table I shows the distribution of the personnel.

TABLE I

NEVADA ENVIRONMENTAL PROTECTION SERVICE

Air Quality Control Section
Current (1976) Staffing Level

Position	1976
Engineer	2
Scientist	1
Technician	3
Other	1
TOTAL	7

The District Health Department of Clark County and Washoe County District Health Department are the two air pollution control authorities which contribute to abatement activities on the municipal level. According to the 1974-1975 Directory of Governmental Air Pollution Agencies, published by the Air Pollution Control Association, there are 15 professionals involved full-time in air pollution control at the municipal level. Table II provides a position breakdown by county agency.

TABLE II

Nevada Municipal Air Pollution Control Programs
Current (1976) Staffing Level

Position	1976
Clark County	
Engineer	1
Scientist	4
Technician	3
Other	3
Washoe County	
Scientist	3
Other	1
TOTAL	15

Personnel listed in the category "Other" are primarily administrative with the addition of one air pollution strategy planner. The "Scientist" category includes six inspectors and one chemist.

EPS sources estimate that there may be 15 professional and technical personnel working in air pollution control and abatement in industry. The majority of this workforce is employed by Nevada's mining and smelting industry. Approximately 50 percent of this workforce is comprised of engineers, e.g., civil, mechanical, electrical, and chemical; and scientists,

e.g., chemists and meteorologists. The remaining 50 percent are primarily technicians, most of whom are skilled in instrumentation and electronics. Large corporations have indicated that more and more short-term problem solving work is being done by consultants, and that this trend will assuredly continue.

C. Workforce Projections

All workforce projections regarding the air quality control programs are based on the best professional judgements of persons experienced in air pollution control at the state and private sector levels. Future insights and state of the art information of particular importance were provided by Mr. Dick Serdoz of the Department of Human Resources, Environmental Protection Service.

Over the next five years, the EPS Air Section expects to add eight additional staff positions. These projections, by position title, are listed in Table III.

TABLE III

NEVADA ENVIRONMENTAL PROTECTION SERVICE

Air Ouality Control Section
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	2	2	3	3	4	4	5%	17%
Scientist	1	1	2	2	2	2	5%	20%
Technician	3	4	4	5	6	6	5%	16%
Other	1	2	2	3	3	3	5%	30%
TOTAL	7	9	11	13	15	15		17%

The calculations used to determine the percent per annum growth and turnover rate averages were developed by calculating a by year percent change, then totaling and averaging those numbers to give a five year average figure. All subsequent figures will be calculated in the same manner.

As indicated in the introduction section previously, the EPS has proposed an automobile inspection program which if funded, could in the next five years, create the need for approximately 12 additional staff members. These personnel would be involved in both enforcement and inspection activities. Their particular background disciplines are expected to be 50 percent enforcement, e.g., retired police, and 50 percent technical, e.g., air pollution control technicians.

Although specific workforce projections for industrial and municipal air pollution control authorities were not available, more stringent enforcement of existing regulations and the possible development of additional air quality standards is expected to necessitate workforce increases in both municipal and industrial air pollution abatement areas. If staffing increases do occur, technicians, scientists, engineers, and meteorologists are expected to fill these positions. At the present time these personnel are responsible for environmental policy planning, long-range planning of facilities and equipment, conducting environmental studies, preparing environmental impact statements, maintaining an up-to-date knowledge of new rules and regulations, and providing assistance to industry in solving air pollution control problems.

Most industries tend to avoid hiring college graduates who lack experience in the field. Student intern programs are used by some corporations to train and identify prospective employees who have requisite skills and are thought to be easily trainable. Recruitment of personnel into the environmental field often originates with existing employees. Knowledge of company operations and policy are thought to provide a well-rounded base for building a company-minded environmental official.

D. Training and Certification

Formal training plans have not been developed, but EPS staff has been receiving training. Areas covered include supervisory training, first aid training, quality assurance training, and fire fighting training. Summaries of the courses are prepared by staff members for future reference.

Occasional seminars are also held. One such seminar, sponsored by the Air Programs Office in 1976, covered stack sampling. It drew an attendance of 30 persons, with 50 percent from state and municipal regulatory staff and the other 50 percent from industry air pollution abatement personnel. In 1977, EPS expects to combine their training efforts with assistance from the regional EPA staff to continue the seminar on a yearly basis.

E. Career Potential

Within the public sector, potential career opportunities are expected to develop in response to increased regulatory responsibilities and the possible development of an auto inspection program. Special educational

disciplines most suited for employment in this area include chemical engineers, technicians, and traditional natural science degreed personnel with rigorous emphasis in physics, chemistry, and mathematics.

F. Conclusion

Presently, the air pollution control field is staffed by individuals holding degrees in engineering, chemistry, and traditional science disciplines. Many of these professionals have been involved with the environmental aspects of air pollution for a relatively short period of time. Faced with the recent development of extensive technological advances, a need for upgrade training has emerged. Due to time constraints, financial restrictions, and training availability, upgrade training in this area is not expected to develop as needs require.

In view of the small number of industrial concerns involved with air pollution control, workforce activity at the private level is not expected to change dramatically in the next five years.

II. NOISE

A. Introduction

The Noise Control Act of 1972 directs EPA to serve as coordinator for all federal noise abatement activities and to give technical assistance to state and local agencies and the general public.

In Nevada, the noise abatement activities are considered a low priority program at the present time. OSHA noise regulations are enforced by the Industrial Commission Occupational Safety and Health Board (ICOSHB). On the municipal level, enforcement is the responsibility of state law personnel, although enforcement occurs on a nuisance complaint basis for the most part.

B. Workforce Profile

ICOSHB sources estimate a part-time noise control workforce of thirteen professionals maintaining state-wide noise abatement activities. This workforce includes two administrators, two industrial hygienists who are noise specialists, and nine safety and health persons who do regular health compliance monitoring in several areas in addition to noise.

Las Vegas currently is the only city in Nevada which has municipal noise ordinances. There are regulations including acoustical criteria in the areas of nuisance and vehicles. In the area of zoning there are regulations that do not include acoustical criteria. There are no ordinances presently covering the areas of railroads, recreational vehicles, aircraft, construction, and buildings. Enforcement is handled by local law authorities

in response to complaints and the omissions of acoustical criteria means that the regulations are nonquantitative and therefore difficult to enforce.

There are also various state-wide restrictions pertaining to noise. Currently, they are in the areas of motor vehicle sound level limits, motorcycle sound level limits, and off-road recreational vehicles sound level limits.

C. Workforce Projections

While sources in the field indicate that the workforce in compliance and monitoring of OSHA regulations is expected to remain at the current levels, the implementation of EPA's national program strategy to abate noise may create an abundance of activity at the state and local levels. Their approach to state and local communities will be implemented when additional personnel resources become available to the noise program, hopefully October, 1977. Their strategy is composed of two related programs: The Quiet Communities Program (QCP) and Each Community Helps Others (ECHO) Program. The QCP program would select a limited number of demonstration communities, and establish an intensive relationship between EPA and these communities to develop a model noise control program in such areas as construction site noise, motor vehicle noise, railroad noise or boundary line standards. These communities, as well as other communities with well developed and successful noise control programs, would be assisted by EPA under the ECHO program to provide direct, person-to-person technical assistance to other communities with similar problems.

Workforce activity, in conjunction with this national program strategy, is expected to increase within the next five years, however specific projections are not available at this time.

D. Training and Certification

Although noise abatement training activity is essentially non-existent at the present time, extensive training activity aimed at state and local planning and enforcement personnel is expected to develop in response to national program strategy. Specific federal training program content has yet to be developed at this time.

E. Career Potential

In response to the national noise abatement strategy, career opportunities for planning and enforcement personnel are expected to develop. Professional disciplines necessary to establish this program will involve acoustical engineers, environmental engineers, community planners, and law enforcement personnel.

F. Conclusion

There is a definite lack of activity in environmental noise control in Nevada. If public awareness in conjunction with national policy does force the development of programs, personnel with expertise in noise abatement and enforcement can expect to enjoy career development at both the state and local levels.

III. PESTICIDES

A. Introduction

The Nevada Pesticides Act may be cited as the primary pesticide law. This act provides regulations concerning registration of pesticides, certification of pesticide applicators, and restricted-use pesticide dealer registration. The Executive Director of the State Department of Agriculture has been delegated exclusive jurisdiction in all matters pertaining to the distribution, sale, and transportation of pesticides and pesticide application devices.

The Nevada Department of Agriculture, Division of Plant Industry, is the prime authority responsible for the control and abatement of pesticide misuse and pollution. Specific program objectives include pesticide applicator certification, pesticide monitoring, on-site inspections, and pesticide registration application review. Departmental program efforts are supported through cooperative agreements with the Max C. Fleischmann College of Agriculture, University of Nevada to make available to the Department certain professional scientific expertise to assist in labeling and application review activities. The Department has also entered into a cooperative enforcement agreement with the Environmental Protection Agency for on-site inspections at the market, producer establishment and user, both agricultural and non-agricultural points, to ensure a satisfactory level of monitoring for enforcement purposes. This cooperative agreement also includes a 100% import monitoring and a 100% experimental-use permit monitoring activity.

B. Workforce Profile

Workforce information contained within this section was obtained through on-site interviews with professionals working in the Department of Agriculture, Division of Plant Industry. Personnel listed in the following table include administrative and field staffing positions.

TABLE IV

NEVADA DEPARTMENT OF AGRICULTURE

Pesticide Control
Current (1976) Staffing Level

Position	1976
Administrator	2
Investigator	15
TOTAL	17

Most of these professional positions are held by degreed people, although in some cases experience in the field may be used as a substitute qualification. The majority of these people have backgrounds in the biological sciences.

Nevada has recently received final approval of its state plans concerning pesticide applicator certification. To date this plan has been implemented to the extent that 1,000 persons of the total 1,400 anticipated have received training, been examined and are eligible for certification to handle restricted-use pesticides. Current pesticide certification levels are listed in the following table.

TABLE V

NEVADA DEPARTMENT OF AGRICULTURE

Current (1976) Pesticide Certification Level

Type	1976
Commercial Applicator Category	21
Aerial	21
Ground	67
Private Applicator Category	
Farmer	875
TOTAL	963

Sources in the Department have indicated that a total of 1,400 applicators are expected to be certified to use restricted-use pesticides by October, 1977.

C. Workforce Projections

According to sources within the Department of Agriculture, the present staffing levels are not expected to change within the next five years. Although all program areas do not receive top priority workforce allocations, as program goals are achieved, workforce activity is prioritized by program area needs.

It is estimated by field sources that commercial and private pesticide applicator personnel will increase in the next five years by 500, providing a total workforce of approximately 1,400.

Turnover rates in the public sector are relatively low, approximately five percent per year. The annual turnover rates among the labor crews of commercial applicators is reportedly high, approximately 30 percent. This high turnover rate results from the seasonal nature of the job and the comparatively low pay.

D. Training and Certification

The Nevada Department of Agriculture, in cooperation with the University of Nevada Extension Service, provides pesticide applicator training through a 2-day, 10 hour seminar form short course. This course has been offered 17 times in the past two years and has been attended by approximately 1,030 persons. Specific course topics include:

1) Agricultural Pest Control
2) Forest Pest Control
3) Ornamental and Turf Pest Control
4) Seed Treatment
5) Aquatic Pest Control
6) Right-of-Way Pest Control
7) Industrial, Institutional, Structural and Health Related Pest Control
8) Public Health Pest Control
9) Regulatory Pest Control
10) Fumigation Pest Control
11) Mosquito Control
12) Predatory Pest Control
13) Dairy Animal Pest Control
14) Meat Animal Pest Control
15) Poultry Pest Control
16) Apiary Pest Control
17) Nursery Pest Control
18) Turf Pest Control

19) Greenhouse Pest Control

20) Aquaculture Pest Control

E. Career Potential

Increases in the number of commercial applicators will provide career opportunities in years to come, however, because agricultural activity is very dependent upon climatic condition, job security remains relatively low. Jobs on applicator crews are continually available because of the high rate of employee turnover. However, because of the seasonal nature of the job, the low pay, and lack of opportunities for advancement, such jobs do not offer particularly desirable long-term career choices.

Public sector career opportunities available in the future will involve hazardous waste disposal, pesticide inspection, and research activities in integrated pest management technology. These activities will require personnel with backgrounds in agricultural science and a knowledge of the pesticide industry. Although no major workforce increases are expected, attrition and turnover will provide for some career opportunities in this area.

F. Conclusion

Employment opportunities in the public sector will be extremely limited in the future, although some growth may result from increased regulatory responsibility mandated through federal programs involving The Toxic Substances Control Act of 1976. With the many technological advances and the increasing use of integrated pest management practices

there seems to exist a continual need for upgrade training in both the public and private sector workforce. The provision of this training and the training of pesticide applicators may well be the most important task facing pesticide regulatory authorities at this time.

IV. POTABLE WATER

A. Introduction

The State's Department of Human Resources, Division of Health, now administers the State's requirements pertaining to drinking water and is assisted by the Health Districts of Clark and Washoe Counties. The purpose of the water supply regulations is to provide safe non-contaminated drinking water to the general public. Specific areas addressed through these regulations include:

1) Location of water sources
2) Treatment of ground water supplies
3) Disinfection of contaminated water supplies
4) Bacteriological water sampling testing
5) Bottled water permit requirements

Nevada does have a choice of whether to be responsible for enforcement of the Safe Drinking Water Act and its regulations or whether to leave enforcement to EPA. If it wishes to seek primacy enforcement responsibility, which is expected within the next two years, it must:

1) Adopt primary drinking water regulations no less stringent than the federal regulations.
2) Adopt and implement adequate procedures and enforcement authority to compel compliance with regulations, including monitoring and inspections.
3) Keep records and report to EPA.

4) Have a system of variances and exemptions no less stringent than those set by the Safe Drinking Water Act.

5) Adopt and be able to implement an adequate plan for providing safe drinking water under emergency circumstances.

Some of these requirements can be easily met under existing state law, however, there are some laws that will have to be changed to comply with the requirements.

There are also state program elements which must be met before primacy can be delegated to Nevada. Current state requirements and staffing are deficient in meeting EPA regulations and requirements in:

1) Enforcement Authority

2) Surveillance

3) Lab Certification

4) Training and Certification

5) Data Management

6) Public Notification

Nevada's Act and most of their regulation requirements need to be as stringent as those promulgated by EPA if it is to attain enforcement authority. Additional staffing and expenditures are necessary to meet these requirements.

B. Workforce Profile

Information for the workforce profile was obtained through on-site and telephone interviews conducted with personnel from the Department.

Of particular assistance in the collection and compilation of water supply data was Mr. Lou Dodgion, Consumer Health Protection, Department of Human Resources.

The State Department of Human Resources and the Clark and Washoe Health Districts currently have the equivalent of 5 people allocated to the State's drinking water supervision program. These people are engineers and inspectors whose duties include site inspections, water system plans approval, water quality analysis, and regulation enforcement.

Because Nevada has yet to establish a water treatment operators certification program, the specific number of persons involved with municipal water treatment is difficult to ascertain. It has been estimated by field sources that water treatment may involve a workforce of approximately 100 persons.

C. Workforce Projections

Workforce projections are based on the best professional judgement of personnel working within the water supply program.

According to sources in the water program, an increase of eight positions over the current staff is expected. These positions will reflect the increased workload developed through state primacy acceptance of the Safe Drinking Water Act. Specific positions being added and resulting growth rates are illustrated in the following table.

TABLE VI

NEVADA STATE AND LOCAL HEALTH DEPARTMENTS

Drinking Water Supervision Program
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	2	2	3	5	5	5	5%	23%
Inspector	3	4	5	6	7	8	5%	21%
TOTAL	5	6	8	11	12	13		21%

The additional staff noted in the above table are anticipated to perform water supply inventory activities as mandated within the Safe Drinking Water Act.

The water supply treatment operator workforce is not expected to increase over the next five years but to remain constant around 100. If a certification program is developed on a mandatory basis, personnel working in this area can expect to receive training through the Department. Training is expected to be performed on-site by departmental and university personnel. The provision of training and certification can be expected to provide a more highly qualified and effective workforce in this area.

D. Training and Certification

At the present time, although no certification program has been developed, training on-site does occur in conjunction with site inspection activities carried out by the Department. This training is not

provided on a regular basis, consequently the number of training sessions and the number of persons trained during those sessions have not been compiled to date.

Mandatory certification of water supply operators is dependent upon legislative approval. Certification is expected to be developed in accordance with the American Water Works Association standards. The following is an example of requirements acceptable to the Association.

Water Systems Operator I

Nature of Work: Responsible for and in charge of the operation and maintenance of a Class I water supply system (as defined by state classification) and for day-to-day delivery of safe, clear and sufficient water to the community. Performs related work as required. Maintains a constant check on efficiency of plant and system. Supervises work of subordinate employees. Exercises judgement and initiative.

Examples of Work: Operates and checks equipment, instruments, pumps, valves. Takes readings of pressures, volumes, weights, levels and other data, and records it on log sheet. Lubricates, cleans and adjusts equipment. Keeps records of all phases of operation and maintenance. Collects, prepares samples and makes laboratory analyses. Directs and supervises laborers. Plans and schedules work.

Essential Knowledge, Abilities and Skills: Knowledge of operation, maintenance and repair of mechanical and electrical equipment. Ability to (1) check and detect flaws in operation of equipment; (2) make minor repairs to equipment; (3) use hand tools; (4) keep neat records and reports; (5) make routine tests; and (6) give clear and understandable instructions. Good physical condition.

Qualifications: High school graduate or its equivalent. Interest in sciences or mathematics. Ability to do simple arithmetic. Mechanical aptitude.

Desirable Training and Experience: Experience in operating and maintaining mechanical equipment, particularly at water systems. Supplemental courses in chemistry. Vocational school training.

Certification Requirements: Possession of a Class I (or higher) water supply systems operator's certificate or designation as a Class I operator from the State Certification Program.

Water Systems Operator II

Nature of Work: Responsible for and in charge of the operation and maintenance of a Class II water supply system (as defined by state classification) and for day-to-day delivery of safe, clear, and sufficient water to the community. Performs related work as required. Maintains a constant check on efficiency of plant and system. Supervises work of subordinate employees. Exercises judgement and initiative.

Examples of Work: Operates and checks equipment, instruments, pumps, valves, meters, and other apparatus. Observes condition of raw water and makes or conducts and/or operates and backwashes filters. Makes daily inspection of mechanical and electrical operating condition of equipment, and records findings. Supervises general maintenance. Takes samples and makes laboratory analyses. Keeps log of plant or system operations. Calculates operating performance and cost. Keeps records and reports. Directs and supervises laborers. Plans and schedules work and assignments. Budget preparation.

Essential Knowledge, Abilities, and Skills: Knowledge of (1) principles, practices and methods of water treatment, storage and distribution; (2) operation of mechanical and electrical equipment; (3) occupational hazards and safety; (4) proper methods of lubricating, maintaining and adjusting equipment. Ability to (1) maintain, repair, and adjust pumps, chemical feeders, instruments and other water systems equipment; (2) check operation of mechanical equipment, detect flaws and defects, and make corrections; (3) take accurate readings, keep routine records and make reports; and (4) plan, schedule and supervise work of subordinates. Advises municipal officials on present and future requirements to maintain safe and adequate water supply.

Qualifications: High school graduate or its equivalent. Knowledgeable in sciences and mathematics. Mechanical ability. Experience in mechancial and electrical equipment operation and maintenance. Knowledge of water chemistry.

Desirable Experience and Training: Experience in operating and maintaining equipment at a water system. Supplemental courses in electricity, water chemistry, physics.

Certification Requirements: Possession of a Class II (or higher) water supply systems operator's certificate from the State Certification Program.

Water Systems Operator III

Nature of Work: Responsible for and in charge of the operation and maintenance of a Class III water supply system (as defined by state classification) and for day-to-day delivery of safe, clear and sufficient water to the community. Supervises work of subordinate employees. Maintains a continuing check on efficiency of plant and systems. Performs related work as required. Exercises considerable judgement and initiative.

Examples of Work: Plans, schedules, assigns, and supervises work of subordinate operators, maintenance laborers, clerks and laborers. Supervises and participates in operation and maintenance of treatment plant and distribution systems. Instructs operators about efficient operating methods. Plans and carries out maintenance of all kinds. Finds and corrects operating troubles; supervises repairs. Orders supplies, parts, and spare equipment. Budget Preparation. Determines rate of flow for treatment to meet demand. Keeps necessary records. Makes special reports. Advises municipal officials on present and future requirements to maintain safe and adequate water supply.

Essential Knowledge, Abilities and Skills: Knowledge of (1) equipment, instruments, materials and operating practices for water treatment plants and distribution systems; (2) occupational hazards and safety; (3) water chemistry, bacteriology, laboratory techniques; (4) public health needs; (5) practices, methods, materials and tools of mechanical trades; and (6) methods of training and instructing employees. Ability to (1) analyze complex maintenance and repair needs; (2) supervise maintenance and repairs in plant and on system; (3) plan, layout and inspect work of personnel; (4) establish and maintain systems of cost accounting, bookkeeping, stockkeeping, and recordkeeping, and (5) supervise and handle personnel effectively. Skill in communications and public relations.

Qualifications: High school graduate and two year AA degree or its equivalent. Knowledge and training in basic sciences. Extensive experience in plant operation and maintenance. Courses in water chemistry, electricity, bacteriology, laboratory techniques. Responsible charge of Class III plant.

Desirable Experience and Training: College level degree in science or engineering. Advance training in chemistry, physics, bacteriology, and management. Research and development methods and procedures. Business training with emphasis on economics and costs related to performance. Skill in speaking and writing, management, personnel handling, and public relations.

Certification Requirements: Possession of a Class III (or higher) water supply systems operator's certificate from the State Certification Program.

Water Systems Operator IV

Nature of Work: Responsible for and in charge of operation and maintenance of a Class IV water supply system (as defined by state classification) and for day-to-day delivery of safe, clear and sufficient water to the community. Manages a relatively large organization. Business control. Policy determination. Financial and improvements planning. Public relations. Exercises judgement and initiative on a high level of responsibility.

Examples of Work: General supervision of plants and systems. Plan and recommend policies and budgets. Plan for expansion and improvements of plants and systems. General supervision of personnel. Supervises preparation of reports, records, accounts, requisitions, etc. Reviews operating performance and chemical, physical, and bacteriology analyses. Sponsors research and development. General supervision of training and safety programs. Contact with public officials. Public speaking. Policy-level conferences. Discipline of personnel.

Essential Knowledge, Abilities and Skills: Knowledge of (1) management practices; (2) budgeting; (3) municipal laws and regulations; (4) technical operation of water plants and systems; (5) public health standards; (6) personnel practices; (7) utility economics, service charges and rates, financing needs and limitations; (8) basic sanitary engineering. Ability to (1) investigate, plan and carry out improvement programs; (2) confer knowledgeably with technical operators on plant and system problems and needs; (3) organize and supervise activities of subordinate personnel effectively; (4) effect business controls and economics related to effective performance; (5) stimulate loyalty and enthusiasm of personnel; (6) write and speak persuasively; and (7) develop and carry out public relations programs.

Qualifications: College degree in science or engineering or equivalent training credits to meet college requirement. Broad experience in operation and maintenance of water supply systems. Special courses in chemistry, sanitary engineering, and management. Competency to work successfully within the governmental framework. Management ability.

Desirable Experience and Training: Research and development. Financial planning, rate structures, cost estimating, and operating costs related to performance. Business systems and procedures. Municipal and utility laws and regulations.

Certification Requirements: Possession of a Class IV water systems certificate from the State Certification Program.

E. Career Potential

Career opportunities at the state and local regulatory level are expected to be quite limited. Personnel trained in sanitary engineering and chemistry can expect to find limited job opportunities in this area.

Although primacy acceptance concerning the Safe Drinking Water Act is contingent upon legislative approval, planning and management personnel may be needed within the municipal sector to provide for effective water supply management activities.

F. Conclusion

Recognizing that Nevada has a small rural population, which for the most part provides its own water supply through private wells, the small water supply workforce currently providing drinking water to the major population centers of Reno, Carson City, and Las Vegas is not considered abnormally small. Even then, one of the major identifiable problems facing this workforce is the lack of formal training. This problem frequently adds to the problem of inadequate, inefficient operation of facilities. In turn, this poses a threat to public health. Although the Department has provided some on-site training, this effort will have little impact on treatment plant efficiency if legislative approval of mandatory certification does not occur.

V. RADIATION

A. Introduction

The State regulatory responsibility for radiation control is vested in the Department of Health and Welfare, Radiological Health Section (RHS). It operates in an agreement state with the U.S. Nuclear Regulatory Commission (NRC), and receives regulations guidelines as well as other guidance from them.

The Radiological Health Section currently has two major areas of concern, namely radioactive materials and radiation machines. Regulations pertaining to radioactive materials apply to persons who receive, possess, use, transfer, own or acquire any source of radiation. Regulations concerning radiation machines apply to those persons who receive, possess, or acquire a radiation machine. Exemptions are noted in the regulations.

Licensing is required for radioactive materials and registration is required for radiation machines. Regular checking is conducted by the RHS to ensure compliance with both RHS and NRC regulations and rules. Minimum time check periods for radioactive materials vary from yearly to longer than two years, depending on the type of license issued. Occasional checking of radiation machines is also done to ensure compliance. At the present time there are approximately 85 licenses issued in Nevada for using radioactive materials and 75 licensees, with this number subject to almost constant change. Registration of radiation machines currently exceeds 800.

In conjunction with the two preceding activities carried on by this section is that of monitoring microwave ovens. This is done, however, on a limited basis and currently receives a low priority in respect to other program elements.

B. Workforce Profile

Information for the workforce profile and projections was collected through on-site and telephone interviews with professionals in the field. Of particular assistance was Mr. William C. Horton, Supervisor, Radiological Health Section, Department of Health and Welfare.

The State Rediological Health Section currently is staffed with two professional positions. Both of these people are radiological health physicists with extensive field experience.

Comprehensive information regarding private sector workforce activity was not available. However, according to estimates provided by the Energy Research and Development Administration Publication #78 entitled An Analysis of Nuclear Related Technician Manpower in Western States, there were 94 radiation control technicians working in Nevada as of January 1, 1975. A radiation control technician is defined in the ERDA study as one who monitors personnel, plant facilities, work environment, and plant vicinity to detect and control radioactivity and/or radiation exposure and performs operation, analysis, and calibration of radiation monitoring equipment.

C. Workforce Projections

Sources in the field have indicated that one additional health physicist may be employed by the Radiological Health Section in the next five years. This additional professional position is expected to support monitoring, registration, and licensing activity.

The previously cited ERDA publication reports that 60 additional radiation control technicians will be needed by 1977. Of these positions, 32 will represent the replacement of turnover, while only 29 new positions will be generated. The report also indicates that both radiation control and monitoring technicians positions show an increasing amount of excess demand (inadequate supply) projected for the three year forecast, resulting in a projected 33 percent shortage for 1977. It should be noted that a large number of radiation control technicians in Nevada can be attributed to ERDA activity at the Nevada Nuclear Test Site.

D. Training and Certification

Some training is available through ERDA seminars and courses offered by the Nuclear Regulatory Commission. Communication among professional staff members provides for a continuous exchange of state of the art knowledge and for new personnel represents on-the-job training potential.

Training is available through various Nevada universities for professional positions in radiation and through the community college system for technician level positions.

E. Career Potential

As dependence on nuclear power production increases, and research and development activity expands, many good career opportunities will be developed. Sources in the field have indicated that job opportunities will become available for highly trained engineers and health physicists as well as for technicians, maintenance, and labor personnel. The majority of these positions are expected to develop at the private industry level as radiation becomes a more widely used technological tool.

F. Conclusion

Because radiation technology is a relatively new field, and because extensive training is important in this area, there now exists an excessive demand for qualified personnel. With the increasing use of nuclear power for electrical generation, the by-product, nuclear waste, has become a major concern to public health officials. The proper handling, transportation, and shortage of this waste will require extensive planning in the beginning and equally diligent monitoring during and after storage has been accomplished. The development of a competent, highly trained workforce capable of meeting these demands is considered a major component of the overall effort to control radiation pollution.

VI. SOLID WASTE

A. Introduction

The Department of Human Resources has been designated as the state agency responsible for the administration of all regulatory functions set forth in the Solid Waste Disposal Act. Their goal is to assure that solid waste is properly managed so that public health and the environment are protected. The immediate effort includes updating the solid waste management plan and regulations to comply with the Resource Conservation and Recovery Act, continuing surveillance and enforcement efforts, and preparing a plan and regulations for the management of hazardous wastes.

In support of the Department's regulatory activities, the State Environmental Commission has been delegated authority to develop a statewide solid waste management system in cooperation with the governing bodies of existing municipalities. In addition, the Commission examines and approves or disapproves municipal solid waste management systems.

The State of Nevada has developed a policy to regulate the collection and disposal of solid waste in a manner that will:

1) Protect public health and welfare
2) Prevent water or air pollution
3) Prevent the spread of disease and the creation of nuisances
4) Conserve natural resources
5) Enhance the beauty and quality of the environment

B. Workforce Profile

Information for the solid waste workforce profile and projections was obtained through on-site and telephone interviews conducted with professionals at the Department of Human Resources, Solid Waste Management Section. Valuable assistance was provided by Mr. LaVerne Rosse, Solid Waste Program Director.

The Department's Solid Waste Management Section has been assigned primary responsibility for the control and abatement of solid waste pollution. This section maintains a full-time staff of three engineers who perform the various regulatory functions as listed below.

1) Advise, consult, and cooperate with other agencies and commissions of the state, other states, the Federal Government, municipalities and persons in the formulation of plans for and the establishment of any solid waste management system.

2) Accept and administer loans and grants from any person that may be available for the planning, construction and operation of solid waste management systems.

Investigation and inspection of solid waste disposal systems are carried out by personnel under contract through the Bureau of Consumer Health Services. This workforce is used on a part-time basis and involves nine inspectors degreed in the biological science field. These people have been trained in-house by the solid waste management section to perform investigation and inspection activities.

Private sector disposal workforce activity has been estimated to involve 56 people. This workforce includes landfill owner/operators,

heavy equipment operators, and weighmasters. The following table identifies the private sector disposal workforce by position title.

TABLE VII

NEVADA PRIVATE SECTOR

Solid Waste Disposal
Current (1976) Staffing Level

Position	1976
Landfill Owner/Operator	8
Heavy Equipment Operator	31
Weighmaster	1
Other	16
TOTAL	56

The personnel listed in the position of "Landfill Owner/Operator" may perform a wide variety of functions, including site operation, traffic control, waste identification, and in some instances, resource recovery activity. The personnel in the position "Other" primarily provide support and assistance to landfill operator personnel.

The private sector workforce involving waste collection personnel has been estimated to include some 250 people. These collection service personnel provide collection services to specific population centers. Personnel in this workforce include drivers, jumpers, and occasionally, heavy equipment operators.

C. Workforce Projections

It has been suggested by professionals in the field, that as a result of more stringent regulation enforcement and possible increased

responsibilities mandated by the Resource Conservation and Recovery Act, a probable increase of four staff members will occur over the next five years. These positions will be primarily in the area of planning and management of solid waste systems. Table VIII illustrates this increase within specific position areas.

TABLE VIII

NEVADA DEPARTMENT OF HUMAN RESOURCES

Solid Waste Management Section
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	2	3	3	4	5	5	5%	22%
Sanitarian	9	9	9	9	9	9	5%	0%
Other	0	1	1	1	1	1	5%	n/a
TOTAL	11	13	13	14	15	15		6%

In the preceding table, growth in the engineering staff positions is based on the assumption that Resource Conservation and Recovery Act efforts will necessitate increased research and planning activities. Engineers will be expected to develop systems providing for hazardous waste management and resource recovery capabilities.

Departmental professionals have indicated that increases in the disposal workforce will occur primarily in response to population increases. There exists the possiblity that major changes in solid waste disposal methodology and technology may take place in response to mandates set forth in the Resource Conservation and Recovery Act, but because the complete strategy is still in the developmental stages, the specific effects of this Act have not yet been seen.

The following table provides solid waste disposal workforce projections by position title.

TABLE IX

NEVADA PRIVATE SECTOR

Solid Waste Disposal
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Landfill Owner/ Operator	8	9	10	11	12	12	10%	8%
Heavy Equipment Operator	31	33	36	39	42	45	15%	7%
Weighmaster	1	1	1	1	1	1	5%	0%
Other	16	18	18	20	22	22	15%	7%
TOTAL	56	61	65	71	77	80		7%

It should be noted that the increase in heavy equipment operator personnel reflects upon the current activities involving landfill cover. Of the 120 landfill sites currently operational, only 8 are covered on a daily basis. Sources in the field have indicated that one major impact of the RCRA will be the required daily cover of all landfill sites.

Departmental staff have suggested that a 10% per annum growth in collection personnel will be realized throughout the next five years. This growth will be spread out over all positions operating in that profession and will be the result of increased service to rural areas.

D. Training and Certification

At the present time certification of landfill personnel is not required

by any state or municipal concern, but in the future, handling of hazardous wastes is anticipated to create a need for some form of competency evaluation. Workforce training will be done for the most part on-site by specialists who have received training through community college and vocational/technical programs.

E. Career Potential

In view of the fact that only limited professional positions are expected to develop in the next five years at the solid waste management level, little career potential for degreed sanitary engineers, geologists, and hydrologists in this field is anticipated. However, in response to the RCRA, new career positions may develop in the areas of hazardous waste disposal and resource recovery.

F. Conclusion

Activity in this area currently is dominated by more stringent enforcement of rules and regulations. Job opportunities will likely be more abundant in the physical aspects of collection and disposal than in other areas. As cost constraints continue to restrict rural municipal training efforts, training will be best focused on EPA short-courses offered on-site or at easily accessible locations on a seminar basis. With the planning and implementation of the Resource Conservation and Recovery Act in progress, impact on the solid waste field is expected to be focused on the areas of engineering, systems design, operations management and planning more sophisticated and complex methodologies for disposal

of all wastes. Concordant with these activities, resource recovery and energy conversion activities will also influence job opportunities. Throughout the field more individuals will be needed with defined technical and academic skills in the sciences, management and engineering disciplines.

VII. WASTE WATER

A. Introduction

The policy and purpose of the Nevada water pollution control law is to:

1) Restore and maintain the chemical, physical and biological integrity of water within the state;

2) Prevent, reduce and eliminate pollution;

3) Plan the development and use, including restoration, preservation and enhancement of land and water resources; and

4) Consult and otherwise cooperate with other states, state and interstate agencies, and the Federal Government in carrying out these objectives.

The Department of Human Resources has been designated as the state water pollution control agency for all purposes of federal water pollution control legislation. The State Environmental Commission provides the one exception to this, in that the Commission has the exclusive power to promulgate rules and regulations concerning water pollution control.

Specifically, the State Environmental Commission has been assigned the responsibility to:

1) Develop, propose, promulgate and amend from time to time, after notice and public hearing, rules and regulations implementing and furthering the provisions of the state water pollution control regulations, including standards of water quality and waste discharge.

2) Advise, consult and cooperate with other agencies of the state, the Federal Government, other states,

interstate agencies and other persons in furthering the provisions of the water pollution regulations.

3) Recognize the historical irrigation practices in the respective river basins of this state, and the economy thereof, and their effects in promulgating regulations, water quality standards, and effluent limitations in accordance with the water pollution regulations.

As the state lead agency for the control and abatement of water pollution, the Department of Human Resources has been assigned the following power and duties:

1) To perform any acts consistent with the requirements of the state water pollution control regulations and the requirements of federal water pollution control legislation and conditions thereof relating to participation in and administration by this state of the National Pollutant Discharge Elimination System;

2) To administer and enforce the provisions of the state water pollution control regulations and all rules, regulations and standards promulgated by the commission, and all orders and permits promulgated or issued hereunder by the department;

3) To examine and approve or disapprove plans and specifications for the construction and operation by a political subdivision of new sewerage systems and treatment works and extensions, modifications of or additions to new or existing sewerage systems or treatment works;

4) To advise, consult and cooperate with other agencies and with other persons in furthering the purposes of the state water pollution control regulations;

5) To qualify for, accept and administer loans and grants from the Federal Government and from other sources, public or private, for carrying out any functions under the state water pollution control regulations;

6) To encourage, request, participate in or conduct studies, surveys, investigations, research, experiments, demonstrations and pilot programs by contract, grant or other means;

7) To maintain and to require others to maintain records, monitoring devices and procedures for making inspections and obtaining samples necessary to prepare reports;

8) To collect and disseminate information to the public as the director deems advisable and necessary for the discharge of his duties under the state water pollution control regulations;

9) To develop comprehensive plans and programs for preventing, reducing or eliminating pollution, with due regard to the improvements which are necessary to conserve such waters for the protection and propagation of fish and aquatic life, wildlife, recreational purposes, public water supply, agricultural, industrial and other purposes;

10) To certify all costs and expenditures for any facility, land, building, machinery, equipment, treatment works, sewerage or disposal systems which are acquired, constructed or installed in conformity with the purposes of the state water pollution control regulations;

11) To hold hearings, to issue notices of hearings, to issue subpoenas requiring the attendance of witnesses and the production of evidence to administer oaths, and to take testimony as the director finds necessary to carry out the provisions of the state water pollution control regulations;

12) To exercise all incidental powers necessary to carry out the purposes of the state water pollution control regulations;

13) To delegate any function or authority granted to him under the state water pollution control regulations.

B. Workforce Profile

Information for the workforce profile was obtained through on-site interviews conducted with professionals in the field. Of particular assistance was Mr. Wendell McCurry, Water Quality Officer, Environmental Protection Services.

As the regulatory body for waste water pollution control, the Department of Human Resources, Environmental Protection Services, Water Quality Section, maintains a full-time professional staff of seven persons. In addition, three professionals on loan from the U.S. EPA add support to the state workforce efforts. Program activities involve compliance monitoring surveys, water quality assessments, treatment plant efficiency studies, waste water discharger inventories, NPDES program administration, waste water grants and loan administration.

Table X illustrates the distribution of personnel by profession.

TABLE X

NEVADA DEPARTMENT OF NATURAL RESOURCES

Environmental Protection Services
Water Quality Section
Current (1976) Staffing Level

Position	1976
Engineer	4
Scientist	3
Other	3
TOTAL	10

Personnel listed under "Scientist" include two biologists, and one chemist. The three temporary EPA positions are listed in the "Other" category and are considered to be planners by profession.

Construction of waste water treatment facilities has provided extensive employment opportunities for plant operators over the past five years. Although certification is voluntary at this time, 66 operators have proven their competency by meeting the state certification requirements voluntarily. The following table lists the private sector workforce as indicated by certification level.

TABLE XI

STATE OF NEVADA

Certified Waste Water Treatment Plant Operators
Current (1976) Staffing Level

Classification	1976
Class I	6
Class II	20
Class III	25
Class IV	10
Class V	5
TOTAL	66

Classification definitions will be provided in the Training and Certification section.

C. Workforce Projections

Departmental sources have indicated that an expected growth through the addition of three professional positions will occur over the next five years. This is considered to be in response to more stringent

enforcement of existing regulations and increased efforts in planning activities. The following table illustrates anticipated growth for the Water Quality Section by position.

TABLE XII

NEVADA DEPARTMENT OF HUMAN RESOURCES

Environmental Protection Services
Water Quality Section
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	4	5	5	6	6	6	10%	9%
Scientist	3	3	3	3	3	3	10%	0%
Other	3	3	4	4	4	4	10%	7%
TOTAL	10	11	12	13	13	13		5%

As in the workforce profile shown in Table X, the category "Other" is filled by three part-time EPA personnel and one new full-time state planner.

The following workforce projection for treatment plant operators is based on professional judgement of personnel in the field.

An increase of 59 operators is expected over the next five years. This is expected in response to new facility construction and upgrade construction at existing facilities. Table XIII illustrates this workforce increase by classification level.

TABLE XIII

Nevada Certified Waste Water Treatment Plant Operators
Workforce Projections to 1982 (est.)

Class	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth/ decline (average)
Class I	6	5	5	5	5	5	5%	-3%
Class II	20	18	17	16	15	15	10%	-6%
Class III	25	30	35	40	45	50	15%	15%
Class IV	10	15	20	28	36	40	15%	32%
Class V	5	8	10	12	14	15	15%	26%
TOTAL	66	76	87	101	115	125		13%

The turnover rates in Table XIII are proportionate to certification levels. As personnel become certified at higher levels, they not only increase their salary, but attain a greater sense of professionalism which promotes job security.

D. Training and Certification

Certification of waste water treatment plant operators is still voluntary in Nevada, but the Nevada Water Pollution Control Association Board of Certification has set up operator classification and qualifications which operators may subscribe to. This involves being examined by the Board as to education, experience, and knowledge of waste water characteristics, sewage treatment processes, and treatment plant operation as related to the certificate classification for which examined. Furthermore, operators are required to give evidence of good moral character, dependability, initiative, interest in the work, and other pertinent characteristics in relation to responsible supervision over waste treatment plant operation.

The minimum qualifications for the five classes of operators are as follows.

CLASS I

1. Applicant must have completed grammar school or equivalent.
2. One-half year acceptable employment in a waste water treatment plant.

CLASS II

1. Applicant must have completed grammar school and one year of high school or equivalent, and
2. One year of acceptable employment in a waste water treatment plant.

CLASS III

1. Applicant must have completed two years of high school or equivalent.
2. Three years of acceptable employment in a waste water treatment plant or plants.

CLASS IV

1. Applicant must have completed four years of high school or equivalent;
2. and five years of acceptable operation of waste water treatment plants, two years of which must represent time in a position of responsibility, or two years as Class III.

CLASS V

1. Applicant must have completed two years of a standard curriculum in engineering or a curriculum related to waste water treatment or equivalent, and
2. At least five years of acceptable operation of waste water treatment plant, two years of which must represent time in a position of major responsibility.

EQUIVALENT EDUCATION

1. One year in responsible charge, or two years experience in an important phase of operation other than responsible charge, will be considered equivalent to one year of college or two years of high school.

2. Satisfying completion of recognized courses of study in the field of waste water treatment, such as correspondence courses or short courses will be equivalent to a maximum of six months of college or one year of high school.

3. An operator who can read simple technical material, write legibly, and perform arithmetical calculations necessary to keep satisfactory operation records will be credited with the equivalent of a grammar school education.

4. Experience credited as an equivalent of education may not be applied to the qualification of experience, nor may education credited as an equivalent of experience be applied to the qualification of education.

5. Where applicable, education may be substituted for experience on the basis of two years of high school or one year of college for one year's experience, except that a Class V operator must have a minimum of three years experience (two years responsible charge). For Classes I and II, a minimum of one year experience is required.

EXPERIENCE REQUIREMENTS

1. Responsible charge generally means to be in a position as plant superintendent or assistant superintendent. At large plants where responsibilities are divided, supervisors of important divisions may be credited as having responsible charge.

2. Acceptable operation includes only work involved in operating treatment units. Reports made by State Health Division and water control engineers or agents of the board will be used as a basis for determining whether or not operation is satisfactory.

3. Partial credit may be given for operating experience in maintenance, laboratory work, or work in allied trades such as water plant operation or plumbing.

Although certification of waste water treatment plant operators is still voluntary, training activities are available on a limited basis. According to a recent study done by the Association of Boards of Certification for Operator Personnel in Water and Wastewater Utilities entitled Roles and Responsibilities for Developing a Comprehensive State Water and Wastewater Operation Training Program, in 1976, Nevada did offer a course on waste water through the continuing education system in the state. There

were a total of fifteen participants in this centrally located course. The study also revealed that professionals in the field were asked to estimate the number of operators requiring new entry level training and up-grade training. The answers were 20 and 40 respectively.

E. Career Potential

In view of the small increases expected in staffing on the state level, job opportunities will be limited. Persons having degrees in engineering or the sciences, i.e.,chemistry, hydrology, will be the areas for which a few positions may become available.

Plant operator opportunities will be more substantial due to continued construction of new facilities and expansion of existing facilities. This will mean more job offers for higher level trained operators.

F. Conclusion

The major workforce need is expected to be generated at the treatment facilities level. It is obvious that more stringent enforcement of existing legislation and technological advances in the field of waste water treatment are going to create many jobs for treatment plant operators, maintenance personnel, and a basic labor force. It has been suggested by sources in the field that the proper training and certification of operator personnel may increase efficiency of a treatment plant by 50 percent. This would indicate that operator training in the future will become an important component in the effort to eliminate waste water pollution in Nevada.

VIII. ENERGY

A. Introduction

Through the Nevada State legislative process, two principal agencies have been assigned responsibilities concerning energy management. Within the Public Service Commission, an Energy Management Division has been developed to:

1) Prepare, subject to the approval of the governor, petroleum allocation and rationing plans for possible energy contingencies. The plans shall be carried out only by executive order by the governor.

2) Cooperate, through the Commission's member on the state energy resources advisory board, in coordinating energy programs and activities within the state.

3) Analyze and evaluate present and prospective energy demand and supply alternatives within the state.

4) Develop and carry out projects and programs to encourage maximum utilization of existing energy resources in the private and public sectors of this state.

5) Encourage development of existing and alternate energy resources that will benefit the state.

6) Carry out and administer any federal programs that authorize state participation in fuel allocation programs.

7) Coordinate the energy activities of appropriate state agencies.

8) Serve as a central depository for the state government to collect and store any data and information relating to energy and related subjects.

In addition to the Commission's efforts, an Energy Resources Advisory Board has been created. This Board consists of 15 members which include the following:

1) One member from the petroleum industry.
2) One member from the public service commission of Nevada.
3) One member from an energy distributing utility in the State of Nevada.
4) One member from an energy consuming utility in the State of Nevada.
5) One member from the hotel and resort industry.
6) One member from the agriculture industry.
7) One member from the consuming public.
8) One member from the mining industry.
9) One member from a labor organization.
10) Two members from municipal government.
11) Four members from the general public.

The following responsibilities have been delegated to the Board:

1) Recommend a state energy policy;
2) Recommend appropriate legislation and regulations to promote the conservation, economical utilization, production and distribution of energy resources and supplies;
3) Recommend appropriate steps to alleviate and resolve short-term energy imbalances;
4) Recommend long-range comprehensive plans for energy utilization to improve the efficiency of energy production and to reduce the negative environmental impacts of such measures and;

5) Establish appropriate liaison with other state agencies, interested persons, groups and the Federal Government as may be necessary.

These specific recommendations are developed and presented to the governor yearly and the legislature each odd numbered year.

One of the major focuses in energy alternatives is in the direction of geothermal electrical power production. This is expected to provide a major source of potential energy. The following table identifies future activity in this area.

TABLE XIV

Potential Geothermal Facilities in Nevada

Location	Company	Current status, plans, and other relevant information
Esmeralda County	Magma Power Co., Los Angeles, CA	One exploratory hole has been drilled to a depth of 9170+ feet
Mineral County	Al-Aquitaine Ltd. Calgary, Alberta Canada	Company is drilling 16 shallow temperature gradient holes, each to a depth of 500 feet
Churchill County	Al-Aquitaine Ltd. Calgary, Alberta Canada	Drilling 16 shallow temperature gradient holes, 500 feet each
Churchill County (salt wells)	Anadarko Production Company, Huston, TX	Company is drilling 30 shallow temperature gradient holes, each to a depth of 500 feet

In addition to the above, exploratory drilling will continue or begin in the following locations in Nevada: Black Rock Desert, Dixie Valley, San Emidio, Ruby Valley, Steamboat Springs, Carson Desert, and Beowawe.

Along with the anticipated development of geothermal energy production systems, traditional coal burning electrical power plants are planned to be operational in the mid-1980's. Table XV provides specific information concerning the development of such systems.

The coal fueled power production systems have traditionally been considered environmentally damaging because of the use of high sulfur content coal. This, in conjunction with limited technological capabilities concerning air pollution creates a continuing dilemma for coal burning facilities. However, as a result of technological advances in air pollution control and federal legislation mandating the use of such technologies, newly constructed power production facilities are expected to be relatively pollution-free.

Figure I following illustrates the geographical distribution of potential energy production systems.

B. Workforce Profile

A specific full-time energy management workforce does not appear to exist as an entity of its own at this point in time. However, there have been approximately 20 appointed positions developed through legislation involving the Energy Management Division of the Public Service Commission and the Energy Resources Advisory Board.

C. Workforce Projections

Due to the part-time nature of the existing positions, no workforce increases are expected to develop in the next five years. If full-time employment in this area does develop, it is expected to be extremely dependent on federal funding.

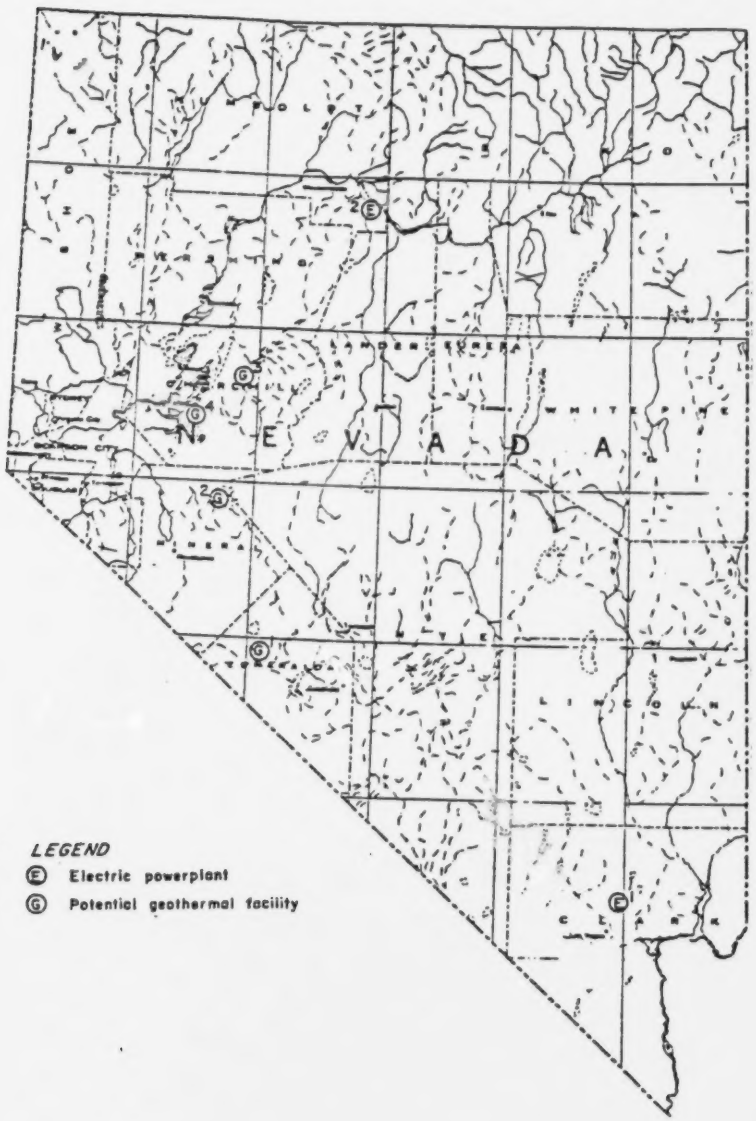
TABLE XV

Future Electric Power Plants in Nevada

Plant name and location	Operating Company	tons per year for coal	Planned capacity		Initial operating date		Peak employment			Remarks
			Unit no.	Mega-watts	Unit no.	Month and year	Unit no.	Construction	Operation	
Harry Allen Nos. 1-4 near Las Vegas Clark County	Nevada Power Co. Las Vegas, NV	Coal-9.1 (total, all units)	1	500	1	June 1982	Total	2,000	250	Nevada Public Service Commission has not received applicants for plant. Employment estimated represent total for all units. A coal slurry pipeline is planned to transport coal from Alton, Utah to plant. Four mile railroad spur to plant is planned.
			2	500	2	June 1983				
			3	500	3	June 1984				
			4	500	4	June 1985				
			Total	2,000						
North Valmy No. 1 & 2 Valmy, Humboldt County	Sierra Pacific Power Company, Reno, NV	Coal-1.0 (total, both units)	1	250	1	Oct. 1980		450	50-60	
			2	250	2	Oct. 1983				
			total	500						

FIGURE 1

Distribution of Potential Energy Production Systems



D. Training and Certification

The Energy Resources Advisory Board is responsible for the provision of recommendations concerning appropriate legislation and regulations to promote the conservation and economical utilization of energy resources and supplies. At the present time, no formalized training programs are operational; however, the development of a public oriented educational program to promote conservation and proper utilization of energy resources is expected within the next five years.

E. Career Potential

Career opportunities are expected to develop in this area for highly trained engineers, scientists, and architects. Vocational/technical personnel may find job opportunities in the areas of resource conversion, recycling, and conservation.

F. Conclusion

Although this area of activity is extremely dependent upon federal support at this time, all indications point to growth in energy related fields. This will create a need for highly trained specialists to develop and implements plans for energy conversion and conservation.

At the present time, the greatest potential source of alternative energy in Nevada is geothermal energy resources. If geothermal electrical generating facilities do become a commercial reality in the near future, highly trained specialists will be needed to develop and maintain pollution control systems specifically to control the particular pollutants inherent in this type of energy production.

Even though energy alternatives do look promising, an energy conservation program is also an integral part of the energy outlook. If energy conservation is expected to reduce public consumption of energy resources effectively, the development of an intensive public education system may well be the most difficult task requiring federal, state, and municipal efforts in the foreseeable future.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

The higher education system of Nevada has not developed a strong environmental program, per se, to date. Most of the offerings are environmentally related courses within individual disciplines. This is partially due to the absence of a strong demand for consolidation of courses under one department, in conjunction with limited financial resources for program development.

The majority of Nevada's higher institutions fall within the University of Nevada System. This consists of three community colleges and two universities, one at Reno and one at Las Vegas.

The three community colleges offer several environmentally related courses. The following is a partial list of courses that have been developed, although they are not necessarily taught every term nor are they all available at all campuses.

Man and Environment
Man and Climate
Wilderness Survival
Energy: Current Problems and Solutions
Introduction to Environmental Planning
Applied Climatology
Air Pollution Techniques and Problems
Ecological Principles for Economic Development

The University of Nevada, Reno, offers environmentally related courses through the interdisciplinary area. These include such courses as "Man and Environment", "Community Environmental Planning", "Lifestyles and the Environment", and "Seminar on Lifestyles and the Environment".

Federal grants are a source of additional funding for programs which do not fall within regular budgeting guidelines. One such federally funded program is the Energy Education Program for Nevada secondary and elementary teachers which was conducted the summer of 1976 and will continue for another session in the summer of 1977.

The University of Nevada, Las Vegas, does not have a single environmental studies program, but rather strong environmental emphasis running throughout the university. There is a heavy emphasis on the environment in both the biology and geology departments. The biology department is noted for its studies in aquatic ecology, environmental physiology, and terrestrial ecology. The geology department offers a course in which all work is done out of the classroom and in the field. Other departments of interest include chemistry, physics, and energy.

While the foregoing is not exhaustive of Nevada's environmental offerings, it does highlight a representative sample of programs available. It seems that Nevada has managed to work around having an environmental studies department with success. Future plans for consolidating these various environmental areas under one heading of environmental studies are not currently being considered.

State Legislation

NEVADA AIR

TITLE:

Air Pollution Control Act
Nevada Statutes 445.401

PURPOSE:

To achieve and maintain levels of air quality which will protect human health and safety and prevent injury to the environment.

DEFINITIONS:

1. Air contaminant
2. Air pollution
3. Commission
4. Department
5. Director
6. Federal act
7. Person
8. Source
9. Complex source

ADMINISTERING AUTHORITY:

Department of Human Resources
State Environmental Commission

AUTHORIZATIONS:

To prevent, abate and control air pollution;
To issue regulations pursuant to the act, including the establishment of air quality standards;
To require air pollution source registration;
To establish emission control requirements;
To act as a state lead agency in air pollution control matters;
To conduct research and studies relating to air pollution;
To approve and issue permits for air pollution control equipment;
To generally enforce the act;
To institute a program of motor vehicle emission inspection and testing.

PROHIBITED ACTS:

To violate regulations concerning air pollution source inspections and permits;
To interfere with inspections under the act;
To cause air pollution other than allowed by air quality standards;
To violate the terms of any permit or other provision of the act.

EXEMPTIONS:

Motor vehicle inspection requirements limited to certain title transfers.

PENALTIES:

Civil fines of from $500 to $5,000.

NEVADA ENERGY

TITLE:

Energy Management Law
Nevada Statute 703.220

PURPOSE:

To provide for the overall management, allocation and energy contingencies for the state.

DEFINITIONS:

ADMINISTERING AUTHORITY:

Public Service Commission

AUTHORIZATIONS:

To prepare energy allocation, rationing, and contingency;
To study and analyze energy demand and supply alternatives;
To encourage conservation and maximum utilization of energy resources;
To serve as the state lead agency in energy matters relating to the federal government.

NEVADA ENERGY

TITLE:

Energy Resources Advisory Board Law
Nevada Statutes 523.010

PURPOSE:

To provide for a comprehensive state energy policy and plan.

DEFINITIONS:

ADMINISTERING AUTHORITY:

Energy Resources Advisory Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To recommend a long range comprehensive energy plan for the state;
To recommend a state energy policy;
To promote the conservation, utilization, production, and distribution of energy resources and supplies;
To issue annual reports to the governor and legislature.

NEVADA PESTICIDES

TITLE:

Custom Application of Pesticides Law
Nevada Statutes 555.260

PURPOSE:

To control the air and ground application of pesticides in order to prevent damage to the environment.

DEFINITIONS:

1. Agent
2. Aircraft
3. Custom application of pesticides
4. Defoliant
5. Desiccant
6. Executive Director
7. Fungi
8. Ground equipment
9. Insect
10. Nematode
11. Person
12. Pest
13. Pest control
14. Pesticide
15. Plant regulator
16. Public operator
17. Snails or slugs
18. Weed
19. Wildlife

ADMINISTERING AUTHORITY:

Department of Agriculture

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To enforce the act;
To classify and restrict pesticide use;
To establish certification standards;
To certify and categorize commercial and private applicators;
To enter and inspect property in enforcement of the act;
To license pesticide dealers.

CERTIFICATION OR LICENSING:

Restricted pesticide dealers must be licensed; applicators must meet certain qualifications and show competence; five different classifications including structural pest.

PROHIBITED ACTS:

To engage in business of restricted pesticide application without certification;
To sell pesticides without licenses;
To violate terms of any license;
To store or dispose of pesticides in a manner harmful to environment.

EXEMPTIONS:

Government research activities, farmers, uses incidental to lawn care.

PENALTIES:

Violation constitutes misdemeanor.

NEVADA SOLID WASTE

TITLE:

Solid Waste Disposal Law
Nevada Statutes 444.440

PURPOSE:

To regulate the collection and disposal of solid waste in a manner that will protect public health and welfare and prevent air and water pollution.

DEFINITIONS:

1. Disposal site
2. Municipality
3. Person
4. Solid waste
5. Solid waste management system

ADMINISTERING AUTHORITY:

State Environmental Commission
Municipalities

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To develop local plans for solid waste management systems;
To develop statewide solid waste management system plan;
To act as the state lead agency in solid waste matters;
To provide technical and financial assistance to local governmental units in solid waste matters;
To inspect and approve solid waste management system plans.

PROHIBITED ACTS:

To dispose of solid waste in a manner which will cause air or water pollution;
To violate any regulations or other provisions of the act;
To dispose of garbage, refuse and other solid waste other than at a solid waste disposal facility.

EXEMPTIONS:

Agricultural activities and mining operations.

PENALTIES:

Violations constitute a misdemeanor.

NEVADA WASTE WATER

TITLE:

Water Pollution Control Law
Nevada Statutes 445.131

PURPOSE:

To prevent, reduce and eliminate water pollution in the state, and to plan the development and use of the preservation and enhancement of water resources.

DEFINITIONS:

1. Commission
2. Department
3. Director
4. Discharge
5. Effluent limitation
6. Interstate agency
7. Municipality
8. Person
9. Point source
10. Pollutant
11. Pollution
12. Treatment works
13. Waters of the state
14. Water quality standard or limitation

ADMINISTERING AUTHORITY:

Department of Human Resources
State Environmental Commission

AUTHORIZATIONS:

To issue regulations relating to the control of water pollution;
To act as the state lead agency in water pollution control matters;
To issue construction permits for sewage systems and treatment works;
To conduct studies and investigations relating to water pollution;
To develop a comprehensive state plan relating to water pollution prevention;
To administer the states pollutant discharge permit system;

AUTHORIZATIONS (Cont'd):

To establish state water quality standards;
To establish effluent limitation standards;
To enter and inspect property in enforcement of the act;
To provide for continuing water pollution control planning.

PROHIBITED ACTS:

To discharge any water pollutant without a proper permit;
To discharge radiological, chemical or biological warfare agents into the water;
To construct or modify any treatment works without proper approval;
To violate the terms of any permit.

PENALTIES:

Compliance orders and injunctions can be instituted;
Civil fines of up to $10,000 per day;
Criminal fines - first offense fines of up to $25,000 or one year imprisonment;
Subsequent offenses - fines of up to $50,000 and from 1 to 6 years imprisonment;
Penalty may also be imposed for any damage actually caused.